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(54) **PLASTIC GLAZING FOR A TAILGATE OF A VEHICLE HAVING A LIGHT ASSEMBLY**

KUNSTSTOFFVERGLASUNG VON HECKKLAPPEN MIT EINEM BELEUCHTUNGSSYSTEM

VITRAGE EN PLASTIC DE HAYONS COMPRENANT UN SYSTÈME D'ÉCLAIRAGE

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to plastic glazings for tailgates and, specifically, to tailgates of vehicles comprising a plastic glazing combined with a lighting assembly.

TECHNICAL BACKGROUND

[0002] The documents WO 2015/079186 A1 and DE 10 2009 058 788 A1 are disclosing vehicle glazing for tailgate comprising a light assembly.

[0003] Vehicles such as sports utility vehicles ("SUVs"), vans, hatchbacks, and the like include a structural component known as a tailgate. The tailgate is provided to open or close an opening formed at a rear portion of a vehicle. The tailgate is typically hinged to the main vehicle body, for example, along its upper end, such that it can swing open and close. Examples of tailgates include a rear door tailgate or a truck lid tailgate.

[0004] The tailgate may support one or more other vehicle components, such as a rear window and one or more light assemblies (e.g., a supplemental brake light, a puddle light). The tailgate may also be adjacent to body cavities into which rear lamp units are inserted. These parts and other parts may add to the cost and complexity of assembling a vehicle.

[0005] Light assemblies in vehicles, in particular, comprise a large number of separate components. For example, a typical vehicle may have several different types of lights, including, for example, parking lights, turn indicator lights, brake lights, and the like. Each of these lights may be made from many parts. These parts add to the cost and complexity of assembling a vehicle. Accordingly, as recognized in U.S. Patent No. 7048423 ("the '423 Patent"), it is desirable to have a lighting assembly with fewer parts. The '423 Patent discloses an integrated light assembly including a plurality of lamps 210, 216 enclosed in a housing 202, which may serve as a lens for the lamps, and mounted on a substrate 204. Because the lamps 210, 216 share a common substrate and lens, the additional cost of having a separate lamp unit is eliminated. This structure disclosed in the '423 Patent, however, has many drawbacks. For one, because multiple lamps are mounted together in a single housing without sidewalls or reflectors for directing the angle of their light, the structure does not account for haziness issues. Moreover, if two lights of varying color are mounted in the housing, the structure disclosed in the '423 Patent does not have a way of preventing color overlap. These drawbacks may limit the use of such a light assembly in a vehicle under state and federal regulations governing vehicle lighting requirements. Thus, while the '423 Patent discloses an integrated part for a vehicle, its application may be limited.

[0006] Moreover, conventional light assemblies in ve-

hicles, including the one described in the '423 Patent, remain separate from other vehicle components. In particular, a light assembly may have a lens portion and a housing portion that are separate from the remaining components of a vehicle. Thus, while a light assembly may be placed behind a translucent component of a vehicle, such as, for example, a glass exterior, the light assembly may have a separate lens for transmitting a light to an exterior of the vehicle. And while a light assembly may be supported in place in a vehicle by another vehicle component, the light assembly may have a separate housing unit for supporting its light source. Such portions of a light assembly may add to the overall weight of a vehicle, and the overall complexity and cost of manufacturing and assembling a vehicle.

[0007] Inhomogeneities such as seams and openings between separate vehicle components may also add to the cost of assembling, sealing and/or insulating an interior of the vehicle and/or its components. Moreover such seams and openings may cause aerodynamic inefficiencies and disturb the vehicle's overall aesthetical appearance. Additional components may also be required to connect separate vehicle components to one another, which may add to the overall weight of a vehicle.

[0008] The present disclosure aims to solve these problems and other problems in the prior art.

SUMMARY

[0009] In accordance with the purpose(s) of the invention, as embodied and broadly described herein, this disclosure, in one aspect, relates to vehicle tailgates, to plastic glazing for vehicle tailgate and to lighting systems of tailgates.

[0010] As will be apparent from the present disclosure, problems and/or objectives for improvement with respect to a tailgate including plastic glazing, as described herein, may include providing a tailgate that integrates one or more other components of a vehicle, thereby reducing a total number of components of a vehicle and reducing the complexity and cost of assembling a vehicle. Such problems and/or objectives for improvement also may include providing a tailgate that reduces a number of inhomogeneities, seams, and other faults along a surface of a vehicle, thereby increasing an aesthetic appearance of the vehicle and increasing aerodynamic performance. Such problems and/or objectives for improvement further may include providing a tailgate that conceals one or more other features of a vehicle, such as, for example, a light assembly or unit, thereby increasing an aesthetic appearance of the vehicle.

[0011] Problems and/or objectives for improvement with respect to a tailgate, as described herein, may also include providing a tailgate with integrated lighting functions. For example, the present disclosure may provide a tailgate having a plastic glazing that functions as a lens of a molded light assembly. The molded light assembly may be, for example, a tail lamp, a turn signal light, a

puddle light, a license plate light, or an interior light. A housing unit connected to the back of the plastic glazing may support and isolate the molded light assemblies from one another, thereby preventing any color overlap between the various light assemblies. The housing unit may also remove the need for a separate housing unit for each molded light assembly. As such, the housing unit and the plastic glazing of the tailgate may reduce a number of components required to assemble the lighting system of a vehicle. The plastic glazing may also be made using an automated, machine-based, injection molding process, further streamlining production and reducing labor costs.

[0012] Problems and/or objectives for improvement with respect to a tailgate, as described herein, may also include replacing certain heavier components of a vehicle with plastic components. For example, the present disclosure may provide a tailgate formed entirely of plastic components, whereby a translucent portion of the tailgate that is transparent may serve as a rear window instead of a glass component. The plastic may weigh less than a glass window, and may also have stronger structural qualities.

[0013] Problems and/or objectives for improvement with respect to a tailgate, as described herein, may also include incorporating a texture, marking, or the like into a plastic glazing of a tailgate in order to enhance certain lighting features of the tailgate. The texture, marking, etc. may affect the passage of light through the plastic glazing to serve both a functional and aesthetical purpose. For example, the plastic glazing may comprise a texture along a region that serves as a lens of a molded light assembly to disperse light emitted by the molded light assembly to satisfy regulatory requirements and/or produce a certain aesthetical effect.

[0014] The present invention, as defined in claim 1, is solving the problems set out above. Accordingly, aspects of the present disclosure provide plastic glazing of a tailgate of a vehicle, the plastic glazing comprising: a first translucent component; a second translucent component molded onto the first translucent component, wherein the second translucent component comprises a color, wherein the plastic glazing is of one-piece molded plastic construction, wherein an overlapping portion of the first translucent component and the second translucent component forms a lens of a first molded light assembly.

[0015] Additional aspects of the invention will be set forth in part in the description which follows. The advantages of the invention will be realized and attained by means of the elements and combinations particularly pointed out in the appended claims. It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The foregoing summary, as well as the following detailed description, is better understood when read in conjunction with the appended drawings. There is shown in the drawings example embodiments, and the present invention is not intended to be limited to the specific embodiments and methods disclosed.

FIG. 1 is a schematic view of a front of a first exemplary plastic glazing of a tailgate in accordance with an embodiment of the present disclosure.

FIG. 2 is a deconstructed view of a tailgate assembly including the first exemplary plastic glazing depicted in FIG. 1 and a housing unit in accordance with an embodiment of the present disclosure.

FIG. 3 is a partial cross-sectional view of the first exemplary tailgate glazing depicted in FIG. 1 with a partial cross-sectional view of a housing unit in accordance with an embodiment of the present disclosure.

FIG. 4 is a partial cross-sectional view of the first exemplary tailgate glazing depicted in FIG. 1 with a partial cross-sectional view of a housing unit in accordance with an alternative embodiment of the present disclosure.

FIG. 5 is a schematic view of a front of a second exemplary plastic glazing of a tailgate having a logo or marking in accordance with an embodiment of the present disclosure.

FIG. 6 is a schematic view of an outer panel of a vehicle configured to fit together with the second exemplary plastic glazing depicted in FIG. 5 in accordance with an embodiment of the present disclosure.

FIG. 7 is a schematic view the second exemplary plastic glazing depicted in FIG. 5 assembled with the outer panel depicted in FIG. 6 in accordance with an embodiment of the present disclosure.

FIG. 8 is a partial cross-sectional view of the second exemplary plastic glazing depicted in FIG. 5.

FIG. 9 is a schematic view of a front of a third exemplary plastic glazing of a tailgate having applique lighting in accordance with an embodiment of the present disclosure.

FIG. 10 is a cross sectional view of a vehicle having the third exemplary plastic glazing depicted in FIG. 9.

FIG. 11 is an enlarged view of the cross-sectional view of the vehicle having the third exemplary plastic

glazing depicted in FIG. 9.

DESCRIPTION

[0017] Embodiments of the invention will now be described in detail with reference to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, unless specified otherwise.

[0018] Systems and methods disclosed herein provide a tailgate or lift gate and, in particular, a tailgate having a plastic glazing having a one-piece monolithic construction. The one-piece monolithic structure can be fabricated in one piece using an injection molding process. Vehicles of a hatchback or van configuration typically include an access opening at their rear and a tailgate that selectively opens and closes the access opening. The tailgate may be mounted on the main body of the vehicle using a hinged connection. As such, the tailgate may operate like a hinged flap, which swings open and close along the hinged connection. The tailgate is typically operated manually but may also be operated electronically using a power actuator.

[0019] The tailgate may support one or more other vehicle components such as a rear glass window, a logo or marking, a light assembly or unit, a license plate holder, etc. These components are usually attached to the tailgate using screws or other connectors or an adhesive. In its closed position, the tailgate may also be adjacent to one or more cavities in the body of the vehicle for receiving a rear lamp unit or other light unit.

[0020] In order to reduce the number of separate components of a vehicle, systems and methods disclosed herein may provide an integrated tailgate assembly including and/or integrating one or more other vehicle components. For example, systems and methods disclosed herein may provide a tailgate having a plastic glazing including a rear window. The plastic glazing of the tailgate may be constructed of a thermoplastic polymer including a portion that is clear as the rear window. In other systems and methods disclosed herein, additional vehicle components may also be included in the plastic glazing. Such components may include, for example, a colored translucent portion for a rear light unit; an additional translucent portion for a courtesy light, a license plate light, or other light unit; a cavity and fixation unit (e.g., a threaded hole, a hook or clip) for supporting a light unit; a cavity and fixation unit for supporting a license plate; a textured and/or raised region for a logo or other marking; a spoiler or other aerodynamic feature; an opening that serves as a ventilation opening; and the like.

[0021] In particular, systems and methods disclosed herein may also provide an improvement over existing vehicles having separate light units. Light units in many conventional vehicles are typically self-contained and separate from the other components of the vehicle. Each light unit typically requires its own housing unit and lens. Systems and methods disclosed herein provide an im-

provement over such existing systems by providing a light unit that is integrated with other components of a vehicle. Specifically, systems and methods disclosed herein may provide a plastic glazing of a tailgate that may function as a lens of a light unit. Systems and methods disclosed herein may also provide a housing structure for a tailgate that may function as the housing unit for multiple different light units. Accordingly, systems and methods disclosed herein eliminate the need for having a separate light unit in a vehicle. Such systems and methods allow a light source to be supported within a housing of a tailgate and to use a plastic glazing of the tailgate as its lens. As such, such systems and methods disclosed herein reduce a number of components of a vehicle's light units, thereby reducing a cost of manufacturing and assembling the vehicle.

[0022] Systems and methods disclosed herein may provide a tailgate having an integrated lighting system that conforms to certain federal regulatory requirements and/or international standards for vehicle lighting. For example, certain international standards, such as, for example, ECE Regulation No. 48 and SAE Standard J578, may require specific colors of light be emitted from a lighting device for a vehicle. In systems and methods disclosed herein, a light source (e.g., a LED) may be positioned behind a plastic glazing. The color of the plastic glazing may shift the color of the light from the light source. Accordingly, if light sources from existing lighting systems are used, the color of the light emitted from the plastic glazing into the surrounding environment may no longer be in conformance with certain legal requirements. Systems and methods disclosed herein, however, may use light sources having adjusted colors that compensate for the color shift of the plastic glazing. Alternatively, systems and methods disclosed herein may use components for forming a plastic glazing having colors that enable a transmission of light within the legal color space when used with existing light sources. As such, systems and methods disclosed herein provide a method for accounting for a color shift resulting from the use of a colored plastic glazing, such as, for example, a plastic glazing having a green or brown glazing color. A colored plastic glazing may especially be desirable for privacy tinting purposes.

[0023] Systems and methods disclosed herein may also provide a tailgate having interior lighting functions. Many individuals desire having interior lighting in a vehicle for both functional and aesthetical purposes. For example, interior lighting may be used to provide a unique ambience within a vehicle. As another example, lights designed to illuminate an interior of the vehicle may serve certain guiding functions. The inclusion of interior lights oftentimes may add to the expense of manufacturing and assembling a vehicle due to the need for additional lighting components. Systems and methods disclosed herein, however, may provide a method for integrating an interior lighting feature into a plastic glazing of a tailgate of a vehicle. The interior lighting feature may be formed

as part of an injection molding process for forming the plastic glazing of the tailgate. Accordingly, such systems and methods may reduce a number of additional components needed for the interior lighting feature. Because the injection molding process may be machine-automated, such systems and methods may also automate the process for forming the interior lighting feature.

[0024] Systems and methods disclosed herein may also provide a tailgate having applique lighting. The tailgate may have a plastic glazing that is formed with a plurality of depressions, each for receiving a corresponding lens or cover component of the applique lighting. The dimensions of the depressions in the plastic glazing and the dimensions of the cover components may be designed to have an interference fit between them, such as, for example, a 0.1mm interference fit. The dimension of the thickness or height of the cover may be configured such that the cover, when placed within the depression, forms a surface that is flush with a surrounding region of the plastic glazing. In a preferred embodiment of the present disclosure, the applique lighting may be in the shape of letters or other graphic designs. The height and width of the letters may vary depending on the desired appearance of the applique lighting.

[0025] Systems and methods disclosed herein may also provide a tailgate that reduces a number of inhomogeneities, seams, and other disruptions, interruptions, and gaps along a surface of a vehicle, thereby increasing an aesthetic appearance of the vehicle and increasing aerodynamic performance. Systems and methods disclosed herein further may provide a tailgate that conceals one or more other features of a vehicle, such as, for example, a light unit, thereby increasing an aesthetic appearance of the vehicle.

[0026] Systems and methods disclosed herein may also provide a method of manufacturing a tailgate or, specifically, a plastic glazing of a tailgate. Such systems and methods may provide a method of producing a plastic glazing using multi-shot injection molding techniques. For example, in certain aspects of the disclosure, a plastic glazing of a tailgate may be formed via a three-shot injection molding process. In a first shot, a clear thermoplastic polymer may be injected to form a shell or outline of the plastic glazing. In a second shot, a colored thermoplastic polymer may be injected to form one or more colored regions in the plastic glazing. For example, a red thermoplastic polymer may be injected to form a red translucent region to serve as the lens for a rear light of a vehicle.

[0027] Referring now to FIG. 1, an exemplary plastic glazing 100 of a tailgate of a vehicle is depicted. The plastic glazing 100 may be a one-piece monolithic structure formed of one or more thermoplastic polymers. Examples of suitable thermoplastic polymers include: polycarbonate, polyester carbonate, poly methyl methacrylate, and the like. According to a preferred aspect of the disclosure, the plastic glazing 100 may be formed of a polycarbonate. The plastic glazing 100 can have an outer

surface that is seamless, *i.e.*, lacking any visual openings, junctions, disruptions, interruptions, gaps, or the like.

[0028] The plastic glazing 100 has a first colored portion 102 that functions as a portion of a right tail lamp of the vehicle, and a second colored portion 104 that functions as a portion of a left tail lamp of the vehicle. In particular, the colored portions 102, 104 can function as lenses of the tail lamps of the vehicle. The plastic glazing 100 also has a third portion 106 for an additional light unit such as, for example, an axillary brake light or a courtesy light. The plastic glazing 100 also includes a clear transparent portion 108 that functions as a rear window of the vehicle, and a colored non-transparent portion 110. The colored non-transparent portion may be strategically placed to hide one or more structures positioned behind the plastic glazing 100.

[0029] Referring now to FIG. 2, a housing unit 200 of a tailgate is depicted. The housing unit 200 may be formed of a fiber-reinforced polymer. According to a preferred aspect of the disclosure, the housing unit 200 may be formed of a long-glass fiber-reinforced polypropylene such as, for example, SABIC® STAMAX™ plastic. As depicted in FIG. 2, the housing unit 200 comprises one or more cavities for receiving a light unit. In particular, the housing unit 200 comprises a first cavity 212 for receiving a first light unit 202, a second cavity 214 for receiving a second light unit 204, and a third cavity 216 for receiving a third light unit 206. The light units 202, 204, 206 can be fixed directly onto the housing unit 200 via access doors and/or using mechanical fasteners (e.g., screw, bolt, and the like). The cavities 212, 214, 216 can prevent light from the light units from bleeding outside of a confined space. As such, additional cavities (not depicted) may be formed next to the cavities 212, 214, 216 for holding additional light units, and the cavities would prevent the light generated by one light unit from bleeding into a space reserved for another light unit.

[0030] The light units 202, 204, 206 may be a single type of light unit. For example, the light units 202, 204, 206 can be brake light units. Alternatively, the light units 202, 204, 206 may comprise more than one kind of light unit. For example, the light units 202, 204 can be brake light units, and the light unit 206 can be a courtesy light unit.

[0031] The plastic glazing 100 may be secured to the housing unit 200 such that the light units 202, 204, 206 are disposed between the plastic glazing 100 and the housing unit 200. In particular, the plastic glazing 100 may be secured to the housing unit 200 such that the light units 202, 204, 206 are disposed behind the portions 102, 104, 106 (depicted in FIG 1). The light unit 202 may be disposed behind the first colored portion 102, the light unit 204 may be disposed behind the second colored portion 104, and the light unit 206 may be disposed behind the third portion 106.

[0032] Each of the light units 202, 204, 206 may comprise a light source that generates a white or a colored

light. The light generated by the light units 202, 204, 206 may pass through the portions 102, 104, 106, respectively.

[0033] Light emitted from the light units 202, 204, 206 through the portions 102, 104, 106 of the plastic glazing 100 may be emitted as a colored light in accordance with certain international standards governing vehicle lighting such as, for example, ECE Regulation No. 48 and SAE Standard J578. As noted above, the portions 102, 104 can function as the lens for the vehicle's tail lamps. Accordingly, light emitted from the light units 202, 204 through the portions 102, 104 may be red. ECE Regulation No. 48 defines the color "red" as emitted light with chromaticity coordinates (x,y) that lie within the chromaticity areas defined by the following boundaries in the CIE xy Y color space:

R ₁₂	yellow boundary:	y=0.335
R ₂₃	the spectral locus	
R ₃₄	the purple line	
R ₄₁	purple boundary:	y=0.980-x

[0034] With the following (x,y) intersection points:

R ₁ :	(0.645,0.335)
R ₂ :	(0.665,0.335)
R ₃ :	(0.735,0.265)
R ₄ :	(0.721,0.259)

[0035] Thus, to fulfill this regulation, the light emitted through the portions 102, 104 may have chromaticity coordinates (x,y) that fall within the chromaticity area defined for the color red in ECE Regulation No. 48, as set forth above.

[0036] While the portions 102, 104 and the light units 202, 204 are described herein as producing a red light, one of ordinary skill in the art would appreciate that the portions 102, 104 and the light units 202, 204 may also be designed to produce lights having other colors, such as, for example, yellow or amber. These colors are also defined in ECE Regulation No. 48 as well as in other international standards.

[0037] The housing unit 200 also includes an opening 208. When the plastic glazing 100 is secured to the housing unit 200 such that the light units 202, 204, 206 line up with the portions 102, 104, 106, the opening 208 may line up with the clear transparent portion 108 of the plastic glazing 100. By lining up with the clear transparent portion 108, the opening 208 allows an individual's view through the transparent portion 108 (which, as described above, may function as the rear window of the vehicle) to remain unobstructed.

[0038] Each of the light units 202, 204, 206 may include one or more light components such as, for example, an incandescent lamp, an electroluminescent lamp, a gas discharge lamp, and the like. Because the light units 202, 204, 206 are secured directly onto the housing unit 200,

a separate housing for each light unit 202, 204, 206 may not be needed. Thus, the housing unit 200, which serves as the structural carrier for the plastic glazing 100 of the tailgate, integrates a housing function of a light unit. Moreover, because the portions 102, 104, 106 may function as the lens of a light unit-*i.e.*, the portion 102 may function as the lens for the light unit 202, the portion 104 may function as the lens for the light unit 204, and the portion 106 may function as the lens for the light unit 206-a separate lens for each light units 202, 204, 206 also may not be needed.

[0039] The plastic glazing 100 may be secured to the housing unit 200 using an adhesive and/or a mechanical fastening system (*e.g.*, a screw bolt or clip fastening system). The adhesive used may be a commercially available adhesive that is typically used in the automotive industry for the adhesive bonding of plastic components. Such adhesives may include, for example, wet adhesives, contact adhesives, hot-melt adhesives, or reaction adhesives. The thickness of the adhesive required may vary depending on the specific geometries of the plastic glazing 100 and the housing unit 200. When the adhesive is a hot-melt adhesive that can be processed under thermoplastic conditions, it may be possible to bond the plastic glazing 100, the housing unit 200, and the hot-melt adhesive together during a multi-shot injection molding process.

[0040] While the tailgate including the plastic glazing 100 and the housing unit 200 is depicted as having three light units 202, 204, 206, one of ordinary skill in the art would appreciate that the tailgate can comprise less or more light units. Such light units may include, for example, license plate lamps, turn signal lamps, backup lamps, and the like.

[0041] FIGS. 3 and 4 present alternative embodiments of a partial cross-sectional view of the plastic glazing 100 depicted in FIG 1 with a portion of a housing unit (*e.g.*, the housing unit 200) disposed behind the plastic glazing 100. In FIG 3, a first embodiment is shown where the plastic glazing 100 is formed of a first component 302, a second component 304, and a third component 310. The first component 302, the second component 304, and the third component 310 are formed of thermoplastic polymers, such as, for example, polycarbonate resins. The first component 302 and the second component 304 may be translucent, and the third component 310 may be non-transparent and non-translucent. An overlapping portion of the first component 302 and the second component 304 may form the colored portion 104.

[0042] A light source 308 of the light unit 204 may be disposed behind the colored portion 104. The light source 308 may emit light beams that travel through the colored portion 104 to an exterior of the vehicle. The light source 308 may be supported by a portion 306 of the housing unit 200. The portion 306 may form the cavity 214 for receiving the light unit 204. The light source 308 may be mounted to the housing unit 200 using a fixation mechanism (*e.g.*, a screw system, an adhesive, and the like).

[0043] When the light beams emitted by the light source 308 travel through the overlapping portion of the first component 302 and the second component 304 (*i.e.*, the colored portion 104), their color, intensity, and direction of travel can be altered depending on the properties of the first component 302 and the second component 304. Relevant properties may include, for example, the colors of the first component 302 and the second component 304, the thicknesses of the first component 302 and the second component 304, the internal molecular structure of the first component 302 and the second component 304, etc. As such, these properties can be adjusted to achieve a certain desired color of emitted light, at a certain dispersion level and at a certain intensity.

[0044] As described above, certain international standards such as ECE Regulation No. 48 and SAE Standard J578 may define certain color requirements for particular types of vehicle lights. For example, the U.S. Department of Transportation requires that vehicle tail lamps emit a red colored light in accordance with SAE Standard J578. SAE Standard J578 defines a red light as a light having a chromaticity value that falls within the color space defined by yellow boundary corresponding to $y=0.33$ and a purple boundary corresponding to $y=0.98-x$. ECE Regulation No. 48 sets forth the same standard. The U.S. Department of Transportation also requires that turn signal lights on vehicles emit a red or amber colored light. SAE Standard J578 defines an amber light as a light having a chromaticity value that falls within the color space defined by a red boundary corresponding to $y=0.39$, a white boundary corresponding to $y=0.79-0.67x$, and a green boundary corresponding to $y=x-0.12$.

[0045] In a preferred aspect of the disclosure, the colors of the first component 302 and the second component 304 may be selected, taking into account the color of the light emitted by the light source 308, such that the color of the light emitted through the plastic glazing 100 may fall within the color space defined required by federal regulations, as defined by the SAE Standard J578 or another international standard. If the light source 308 emits a white light, then the colors of the first component 302 and the second component 304 may be selected such that they impart a red color to the white light as it passes through the first component 302 and the second component 304. If the light source 308 emits a colored light, then different colors for the first component 302 and the second component 304 may be selected such that the color of the colored light shifts accordingly to meet regulatory requirements when it passes through the first component 302 and the second component 304.

[0046] The colors of the first component 302 and the second component 304 may also be adjusted to account for their individual colors. According to the invention, the first component 302 forms a rear window for a vehicle. Thus, it may be desirable to have the first component 302 have a green or brown tint. Such may undesirably shift the color of any light that passes through the first component 302 away from the red or amber color re-

quired by federal regulations. Accordingly, in an effort to avoid falling out of the legal color space, the color of the second component 304 can be selected such that it accounts for the undesirable color shift that the first component 302 will produce.

[0047] While FIGS. 3 and 4 depicts a light source 308 that is disposed behind an overlapping portion of two translucent components (*e.g.*, the first component 302 and the second component 304), one of ordinary skill in the art would appreciate that a single translucent component may operate with the light source 308 to generate a light in accordance with international lighting standards and federal regulations. In certain aspects, the light source 308 may also generate a colored light. Thus, the color of the translucent component through which the generated light travels also can be selected to account for the color of the light generated by the light source 308 such that the light that emerges from the translucent component is in accordance with international lighting standards and federal regulations. In other words, the combination of the color of the light source 308 and the color of the translucent component can be selected such that they produce together a light that is in accordance with international lighting standards and federal regulations. In certain aspects, an additional component (*e.g.*, a separate lens structure) may be placed behind the translucent component of the plastic glazing to further adjust the color and dispersion characteristics of the light that is generated by the light source 308. This additional component may be supported by a housing unit of the tailgate that is disposed behind the translucent component.

[0048] The third component 310 is a non-transparent so that it forms a region of blackout (*e.g.*, opaque or substantially opaque) adjacent to the overlapping portion of the first component 302 and the second component 304 (*i.e.*, the colored portion 104). The third component 310 may be black or be another color and/or effect. This region of blackout may be configured to conceal the sections of the portion 306 of the housing unit 200 that are attached to the plastic glazing 100, and any adhesive or other fixation mechanism used to attach the housing unit 200 to the plastic glazing 100.

[0049] Referring now to FIG 4, a second embodiment of the partial cross-sectional view of the plastic glazing 100 depicted in FIG 1 with the portion 306 of the housing unit is depicted. In this second embodiment, the second component 304 may be replaced with a fourth component 312 having a textured surface 314. The textured surface 314 may be configured to affect a dispersion of light beams that travel through the fourth component 312. Similar to the second component 304 depicted in FIG 3, the fourth component 312 may be disposed behind the first component 302, and an overlapping region of the first component 302 and the fourth component 312 may form a lens for the light unit 204 (depicted in FIG 2). Light that is emitted by the light source 308 of the light unit 204 may travel through the overlapping region of the first component 302 and the fourth component 312. Thus, the

textured surface of the fourth component 312 may be used to affect the dispersion of light travelling through the overlapping region of the first component 302 and the fourth component 312. In certain aspects of the disclosure, the textured surface of the fourth component 312 may be configured such that it creates an aesthetical pattern in the light that is emitted from the overlapping region of the first component 302 and the fourth component 312 (i.e., the colored portion 104). In other aspects of the disclosure, the textured surface of the fourth component 312 may be configured such that it controls the dispersion of light through the colored portion 104 to conform to certain regulatory requirements. As such, the textured surface of the fourth component 312 may be configured to achieve either an aesthetical or functional effect.

[0050] Referring now to FIG 5, an exemplary plastic glazing 400 of a tailgate of a vehicle is depicted. The plastic glazing 400 may be of one-piece monolithic molded plastic construction, and may have an outer surface that is substantially free of any inhomogeneities, seams, and other disruptions, interruptions, and gaps. The plastic glazing 400 may comprise a portion 406 that functions as a lens of a first light unit, a portion 410 that functions as a lens of a second light unit, and a portion 404 that functions as a rear window of the vehicle. The plastic glazing 400 may also comprise a non-transparent portion 402, which can conceal one or more other vehicle components.

[0051] Additionally, the plastic glazing 400 may comprise a logo or marking 408. The logo 408 may be raised from a region of the plastic glazing 400 that surround it. The logo 408 may be an example of a raised marking. Further details of the logo 408 are described with reference to FIG 8 below.

[0052] FIG 6 depicts an outer panel 500 of the vehicle which is designed to attach to the plastic glazing 400. The outer panel of the vehicle may include a main body 502 and an opening 504 through which the logo 408 may fit, as depicted in FIG 7.

[0053] FIG 8 depicts a partial cross-sectional view of the plastic glazing 400 along a line B-B, which passes through the logo 408. As depicted in FIG 8, the logo 408 may be formed of two components, a first component 424 and a second component 422 surrounding the first component 424. The first component 424 and the second component 422 can be selected to be clear or colored, and transparent, translucent, or non-transparent. In a preferred aspect of the disclosure, at least one of the first component 424 and the second component 422 is translucent such that a light disposed behind the plastic glazing towards an interior of the vehicle may shine through the translucent component to increase the visibility of the logo 408, especially when it is dark. The first component 424 and the second component 422 of the logo 408 may be raised from a component 420 which forms a main body of the plastic glazing, including the non-transparent portion 402. The logo 408 can be raised from the rest of

the plastic glazing 400 so that it can fit through the opening 504 of the outer panel 500.

[0054] The first component 424 and the second component 422 may be formed of a thermoplastic polymer. The first component 424 and the second component 422 may be formed as part of an injection molding process for forming the plastic glazing 400. In a first shot, a first material may be injected into a mold cavity having a first volume to form the component 420. Then, in later shots, the first component 424 and the second component 422 of the logo 408 may be molded onto the component 420. The first component 424 and the second component 422 may bind to the component 420 through melt bonding. To enable optimal bonding between the separate components, the first component 424 and the second component 422 of the logo 408 as well as the component 420 may be formed of a similar thermoplastic polymer, e.g., different colors of polycarbonate resin.

[0055] While the logo 408 is depicted as having a first component 424 and a second component 422 in FIG 8, one or ordinary skill in the art would appreciate that raised markings with more or less components may be used. In certain aspects, a plastic glazing may have a logo that is formed as part of the same component as the main body of the plastic glazing. In such an aspect, the logo may be formed when the component forming the main body is molded using an injection molding technique.

[0056] Referring now to FIG 9, an exemplary plastic glazing 700 of a tailgate of a vehicle is depicted. The plastic glazing 700 may also be of one-piece monolithic molded plastic construction, and may have an outer surface that is substantially free of any inhomogeneities, seams, and other faults. The plastic glazing 700 may comprise a main body 702. The main body 702 may have a first translucent portion 704 that is transparent that functions as a rear window of the vehicle. The main body 702 may also have a second translucent portion 706 that functions as a lens of a light unit 726 (depicted in FIG 10).

[0057] Because the plastic glazing 700 does not include any seams or breaks along its different components, the light unit 726 behind the second translucent portion 706 may be concealed from the outside until the light unit 726 is turned on.

[0058] FIG 10 depicts a cross-section of the plastic glazing 700 along the line E-E. As depicted in FIG 10, the light unit 726 can be supported in position by a portion of a housing unit 724. The housing unit 724 may be a portion of an overall housing unit of the tailgate, such as, for example, the housing unit 200 depicted in FIG 2. The housing unit 724 may be attached to the plastic glazing 700 using an adhesive or other fixation mechanism. The plastic glazing 700 may be formed of a plurality of different components that are molded to one another. The plurality of different components may include a first component 708, a second component 722, and a third component 710. The first component 708 can form a first layer of the plastic glazing 700. The second component 722 and the third component 710 can be disposed on

certain regions of the first component 708. The second component 722 can comprise a transparent thermoplastic polymer. An overlapping portion of the first component 708 and the second component 722 may correspond to the first translucent portion 704 depicted in FIG 9. The third component 710 may comprise a non-transparent thermoplastic polymer. As such, the third component 710 can be used to conceal one or more other vehicle components disposed behind the third component 710.

[0059] As depicted in FIG 10, the portion of the housing unit 724 supporting the light unit 726 may attach to the third component 710 of the plastic glazing 700. In a preferred aspect of the disclosure where the third component 710 comprises a non-transparent polymer, the third component 710 may conceal those portions of the housing unit 724 that attached to the plastic glazing 700 along sections where the third component 710 is disposed. The third component 710 may be specifically disposed at those sections of the plastic glazing 700 where the housing unit 724 attaches to the plastic glazing 700.

[0060] Referring now to FIG 11, an enlarged view of an upper region labeled F of the cross-sectional view of the plastic glazing 700 is depicted. As shown in the enlarged view, the first component 708 of the plastic glazing 700 may further comprise two fixation mechanisms 714, 716 for fixing a second light unit 712 to the vehicle. The second light unit 712 may be an interior light unit that projects light through the first component 708, which may be formed of a clear or colored translucent thermoplastic polymer. The second light unit 712 may be secured to the vehicle using any number of known fixation methods. For example, the light unit may be secured to the vehicle by being snapped into place between the two fixation mechanisms 714, 716. The light unit may also be secured to the vehicle using screws, bolts, or other fastening members that can be fixed to the fixation mechanisms 714, 716.

[0061] Additionally, as depicted in FIG. 11, the tailgate including the plastic glazing 700 may further include a spoiler portion 720 and a supporting member 718. The supporting member 718 may be a part of a housing unit (e.g., the housing unit 724) that is disposed behind the plastic glazing 700 for supporting light units and the like. The spoiler portion 720 may be formed of an additional thermoplastic polymer and may be attached to the main body 702 using an adhesive or mechanical fastening system.

[0062] According to certain aspects of the disclosure, the tailgate assemblies disclosed herein may also include additional layers on top of the thermoplastic polymer layers. For example, a layer for increasing scratch resistance may be added to an exterior surface of the plastic glazing. As another example, an additional layer for adding more support to the thermoplastic polymer layers may also be added to an interior surface of the plastic glazing. This additional layer may be formed of a plastic, a metal, or other material for increasing the structural strength of the tailgate.

Claims

1. A plastic glazing (100) for a tailgate of a vehicle, the tailgate having a first molded light assembly, the plastic glazing comprising:
 - a first translucent component (302) forming a rear window for the vehicle;
 - a second translucent component (304) molded onto the first translucent component, characterized in that the second translucent component comprises a color and wherein an overlapping portion of the first component and the second component forms a colored portion (104), and
 - in that the plastic glazing (100) further comprises a non-translucent component (310) forming a blackout region adjacent to the colored portion, wherein the first translucent component, the second translucent component and the non-translucent component are formed of a thermoplastic polymer,
 - wherein the plastic glazing is of one-piece molded plastic construction,
 - wherein the colored portion forms a lens for said first molded light assembly (204).
2. The plastic glazing of claim 1 combined with the first molded light assembly, wherein the first molded light assembly comprises a light source (308) that is configured to generate a light that passes through the overlapping portion of the first translucent component and the second translucent component.
3. The plastic glazing of claim 2, wherein the colored portion forming the lens of the first molded light assembly is configured to operate with the light source (308) to produce a red light having a CIE (x,y) chromaticity value within a color space defined by a yellow boundary corresponding to $y=0.33$ and a purple boundary corresponding to $y=0.98-x$.
4. The plastic glazing of claim 3 further combined with a second molded light assembly and, further comprising a third translucent component molded onto the first translucent component, wherein at least a portion of the third translucent component forms the lens of the second molded light assembly.
5. The plastic glazing of claim 4, wherein the portion of the third translucent component forming the lens of the second molded light assembly is configured to operate with the second molded light assembly to produce an amber light having a CIE (x,y) chromaticity value within a color space defined by a red boundary corresponding to $y=0.39$, a white boundary corresponding to $y=0.79-0.67x$, and a green bound-

ary corresponding to $y=x-0.12$.

6. The plastic glazing of claim 4, wherein the portion of the third translucent component forming the lens of the second molded light assembly is configured to operate with the second molded light assembly to produce a white light having a CIE (x,y) chromaticity value within a color space defined by a blue boundary corresponding to $x=0.31$, a yellow boundary corresponding to $x=0.50$, a first green boundary corresponding to $y=0.15+0.64x$, a purple boundary corresponding to $y=0.05+0.75x$, a second green boundary corresponding to $y=0.44$, and a red boundary corresponding to $y=0.38$. 5
7. The plastic glazing of claim 6, wherein a different portion of the first translucent component forms a lens for third molded light assembly, wherein the third molded light assembly comprises one of a puddle light, a license plate light, and an interior light. 10
8. The plastic glazing of claim 5, wherein the portion of one or more of the first translucent component and the second translucent component forming the lens of the first molded light assembly and the portion of the third translucent component forming the lens of the second molded light assembly are adjacent to each other. 15
9. The plastic glazing of any one of claims 1-8, wherein at least one of the first translucent component and the second translucent component comprises a textured surface (314) configured to disperse light passing through the overlapping portion of the first translucent component and the second translucent component. 20
10. The plastic glazing of any one of claims 1-9, wherein the overlapping portion of the first translucent component and the second translucent component is configured to transmit a light having a percentage of rays that deviates by more than 2.5° from an incident ray of less than or equal to 30 percent. 25
11. The plastic glazing of any one of claims 1-10, wherein the plastic glazing is produced using a multi-shot injection molding process. 30
12. The plastic glazing of any one of claims 1-11, wherein the second translucent component is molded onto the first translucent component in a second shot of the multi-shot injection molding process. 35
13. A vehicle tailgate comprising a plastic glazing (100) according to any of the preceding claims. 40
14. The vehicle tailgate of claim 13, comprising a hous-

ing unit (200) that is configured to support the first molded light assembly, wherein the housing unit comprises a fiber-reinforced polymer and wherein the plastic glazing is attached to the housing unit.

15. Vehicle comprising a vehicle tailgate according to claim 13 or 14. 45

Patentansprüche

1. Kunststoffverglasung (100) für eine Heckklappe eines Fahrzeugs, wobei die Heckklappe eine erste geformte Leuchtenanordnung aufweist, die Kunststoffverglasung umfassend: 50

eine erste lichtdurchlässige Komponente (302), die eine Heckscheibe für das Fahrzeug bildet; eine zweite lichtdurchlässige Komponente (304), die auf die erste lichtdurchlässige Komponente geformt ist,

dadurch gekennzeichnet, dass die zweite lichtdurchlässige Komponente eine Farbe aufweist und wobei ein überlappender Abschnitt der ersten Komponente und der zweiten Komponente einen farbigen Abschnitt (104) bildet, und

dass die Kunststoffverglasung (100) ferner Folgendes umfasst

eine nicht-lichtdurchlässige Komponente (310), die eine Verdunkelungsregion anliegend an dem farbigen Abschnitt bildet, wobei die erste lichtdurchlässige Komponente, die zweite lichtdurchlässige Komponente und die nicht-lichtdurchlässige Komponente aus einem thermoplastischen Polymer gebildet sind, wobei die Kunststoffverglasung aus einer einseitigen, geformten Kunststoffkonstruktion ist, wobei der farbige Teil eine Linse für die erste geformte Leuchtenanordnung (204) bildet. 55

2. Kunststoffverglasung nach Anspruch 1 in Kombination mit der ersten geformten Leuchtenanordnung, wobei die erste geformte Leuchtenanordnung eine Lichtquelle (308) umfasst, die konfiguriert ist, um ein Licht zu erzeugen, das durch den überlappenden Abschnitt der ersten lichtdurchlässigen Komponente und der zweiten lichtdurchlässigen Komponente hindurchgeht. 60

3. Kunststoffverglasung nach Anspruch 2, wobei der farbige Abschnitt, der die Linse der ersten geformten Leuchtenanordnung bildet, konfiguriert ist, um mit der Lichtquelle (308) zusammenzuwirken, um ein rotes Licht zu erzeugen, das einen Chromatizitätswert CIE (x,y) innerhalb eines Farbraums aufweist, der durch eine gelbe Grenze entsprechend $y=0,33$ und 65

eine violette Grenze entsprechend $y=0,98-x$ definiert ist.

4. Kunststoffverglasung nach Anspruch 3, die ferner mit einer zweiten geformten Leuchtenanordnung kombiniert ist und ferner eine dritte lichtdurchlässige Komponente umfasst, die auf die erste lichtdurchlässige Komponente geformt ist, wobei mindestens ein Abschnitt der dritten lichtdurchlässigen Komponente die Linse der zweiten geformten Leuchtenanordnung bildet. 5
5. Kunststoffverglasung nach Anspruch 4, wobei der Abschnitt der dritten lichtdurchlässigen Komponente, der die Linse der zweiten geformten Leuchtenanordnung bildet, konfiguriert ist, um mit der zweiten geformten Leuchtenanordnung zusammenwirkt, um ein gelbes Licht zu erzeugen, das einen Chromatizitätswert CIE (x,y) innerhalb eines Farbraums aufweist, der durch eine rote Grenze entsprechend $y=0,39$, eine weiße Grenze entsprechend $y=0,79-0,67x$ und eine grüne Grenze entsprechend $y=x-0,12$ definiert ist. 10
6. Kunststoffverglasung nach Anspruch 4, wobei der Abschnitt der dritten lichtdurchlässigen Komponente, der die Linse der zweiten geformten Leuchtenanordnung bildet, konfiguriert ist, um mit der zweiten geformten Leuchtenanordnung zusammenwirkt, um ein gelbes Licht zu erzeugen, das einen Chromatizitätswert CIE (x,y) innerhalb eines Farbraums aufweist, der durch eine blaue Grenze entsprechend $x=0,31$, eine gelbe Grenze entsprechend $x=0,50$, eine erste grüne Grenze entsprechend $y=0,15+0,64x$, eine violette Grenze entsprechend $y=0,05+0,75x$, eine zweite grüne Grenze entsprechend $y=0,44$ und eine rote Grenze entsprechend $y=0,38$ definiert ist. 15
7. Kunststoffverglasung nach Anspruch 6, wobei ein anderer Abschnitt der ersten lichtdurchlässigen Komponente eine Linse für eine dritte geformte Leuchtenanordnung bildet, wobei die dritte geformte Leuchtenanordnung eines von einer Umfeldleuchte, einer Kennzeichenleuchte und einer Innenleuchte umfasst. 20
8. Kunststoffverglasung nach Anspruch 5, wobei der Abschnitt von einer oder mehreren der ersten lichtdurchlässigen Komponente und der zweiten lichtdurchlässigen Komponente, die die Linse der ersten geformten Leuchtenanordnung bilden, und der Abschnitt der dritten lichtdurchlässigen Komponente, der die Linse der zweiten geformten Leuchtenanordnung bildet, aneinander anliegend sind. 25
9. Kunststoffverglasung nach einem der Ansprüche 1-8, wobei mindestens eine von der ersten lichtdurchlässigen Komponente und der zweiten licht-

durchlässigen Komponente eine strukturierte Oberfläche (314) umfasst, die konfiguriert ist, um Licht, das durch den überlappenden Abschnitt der ersten lichtdurchlässigen Komponente und der zweiten lichtdurchlässigen Komponente hindurchgeht, zu streuen.

10. Kunststoffverglasung nach einem der Ansprüche 1-9, wobei der überlappende Teil der ersten lichtdurchlässigen Komponente und der zweiten lichtdurchlässigen Komponente konfiguriert ist, um ein Licht zu übertragen, das einen Prozentsatz von Strahlen aufweist, der um mehr als $2,5^\circ$ von einem einfallenden Strahl von weniger als oder gleich 30 Prozent abweicht. 30
11. Kunststoffverglasung nach einem der Ansprüche 1-10, wobei die Kunststoffverglasung unter Verwendung eines Multischuss-Spritzgussverfahren hergestellt wird. 35
12. Kunststoffverglasung nach einem der Ansprüche 1-11, wobei die zweite lichtdurchlässige Komponente in einem zweiten Schuss des Multischuss-Spritzgussverfahrens auf die erste lichtdurchlässige Komponente geformt wird. 40
13. Fahrzeugheckklappe, umfassend eine Kunststoffverglasung (100) nach einem der vorherigen Ansprüche. 45
14. Fahrzeugheckklappe nach Anspruch 13, umfassend eine Gehäuseeinheit (200), die konfiguriert ist, um die erste geformte Leuchtenanordnung zu tragen, wobei die Gehäuseeinheit ein faserverstärktes Polymer umfasst und wobei die Kunststoffverglasung an der Gehäuseeinheit angebracht ist. 50
15. Fahrzeug, umfassend eine Fahrzeugheckklappe nach Anspruch 13 oder 14. 55

Revendications

1. Vitrage en plastique (100) pour un hayon de véhicule, le hayon ayant un premier ensemble d'éclairage moulé, le vitrage en plastique comprenant :

un premier composant translucide (302) formant une lunette arrière pour le véhicule ;
un deuxième composant translucide (304) moulé sur le premier composant translucide, **caractérisé en ce que** le deuxième composant translucide comprend une couleur et dans lequel une partie chevauchante du premier composant et du deuxième composant forme une partie colorée (104), et **en ce que** le vitrage en plastique (100) comprend en outre

- un composant non translucide (310) formant une région d'obscurcissement adjacente à la partie colorée, dans lequel le premier composant translucide, le deuxième composant translucide et le composant non translucide sont formés d'un polymère thermoplastique, dans lequel le vitrage en plastique est d'une construction en plastique moulée d'une seule pièce, dans lequel la partie colorée forme une lentille pour ledit premier ensemble d'éclairage moulé (204).
2. Vitrage en plastique selon la revendication 1 combiné avec le premier ensemble d'éclairage moulé dans lequel le premier ensemble d'éclairage moulé, comprend une source d'éclairage (308) qui est configurée pour générer un éclairage qui passe à travers la partie de chevauchement du premier composant translucide et du deuxième composant translucide.
 3. Vitrage en plastique selon la revendication 2, dans lequel la partie colorée formant la lentille du premier ensemble d'éclairage moulé est configurée pour fonctionner avec la source d'éclairage (308) pour produire un éclairage rouge ayant une valeur de chromaticité CIE (x,y) dans un espace colorimétrique défini par une limite jaune correspondant à $y=0,33$ et une limite violette correspondant à $y=0,98-x$.
 4. Vitrage en plastique selon la revendication 3, combiné en outre avec un deuxième ensemble d'éclairage moulé et, comprenant en outre un troisième composant translucide moulé sur le premier composant translucide, dans lequel au moins une partie du troisième composant translucide forme la lentille du deuxième ensemble d'éclairage moulé.
 5. Vitrage en plastique selon la revendication 4, dans lequel la partie du troisième composant translucide formant la lentille du deuxième ensemble d'éclairage moulé est configurée pour fonctionner avec le deuxième ensemble d'éclairage moulé pour produire un éclairage ambré ayant une valeur de chromaticité CIE (x,y) dans un espace colorimétrique défini par une limite rouge correspondant à $y=0,39$, une limite blanche correspondant à $y=0,79-0,67x$ et une limite verte correspondant à $y=x-0,12$.
 6. Vitrage en plastique selon la revendication 4, dans lequel la partie du troisième composant translucide formant la lentille du deuxième ensemble d'éclairage moulé est configurée pour fonctionner avec le deuxième ensemble d'éclairage moulé pour produire un éclairage blanc ayant une valeur de chromaticité CIE (x,y) dans un espace colorimétrique défini par une limite bleue correspondant à $x=0,31$, une limite jaune correspondant à $x=0,50$, une première limite verte correspondant à $y=0,15+0,64x$, une limite violette correspondant à $y=0,05+0,75x$, une deuxième limite verte correspondant à $y=0,44$, et une limite rouge correspondant à $y=0,38$.
 7. Vitrage en plastique selon la revendication 6, dans lequel une partie différente du premier composant translucide forme une lentille pour un troisième ensemble d'éclairage moulé, dans lequel le troisième ensemble d'éclairage moulé comprend un parmi un éclairage en flaque, un éclairage de plaque d'immatriculation et un éclairage intérieur.
 8. Vitrage en plastique selon la revendication 5, dans lequel la partie d'un ou de plusieurs du premier composant translucide et du deuxième composant translucide formant la lentille du premier ensemble d'éclairage moulé et la partie du troisième composant translucide formant la lentille du deuxième ensemble d'éclairage moulé sont adjacents les uns aux autres.
 9. Vitrage en plastique selon l'une quelconque des revendications 1 à 8, dans lequel au moins un du premier composant translucide et du deuxième composant translucide comprend une surface texturée (314) configurée pour disperser l'éclairage passant à travers la partie de chevauchement du premier composant translucide et du deuxième composant translucide.
 10. Vitrage en plastique selon l'une quelconque des revendications 1 à 9, dans lequel la partie chevauchante du premier composant translucide et du deuxième composant translucide est configurée pour transmettre un éclairage ayant un pourcentage de rayons qui dévie de plus de $2,5^\circ$ d'un rayon incident inférieur ou égale à 30 pour cent.
 11. Vitrage en plastique selon l'une quelconque des revendications 1 à 10, dans lequel le vitrage en plastique est produit en utilisant un procédé de moulage multi-injection.
 12. Vitrage en plastique selon l'une quelconque des revendications 1 à 11, dans lequel le deuxième composant translucide est moulé sur le premier composant translucide dans un second plan d'injection du procédé de moulage multi-injection.
 13. Hayon de véhicule comprenant un vitrage en plastique (100) selon l'une quelconque des revendications précédentes.
 14. Hayon de véhicule selon la revendication 13, comprenant une unité de logement (200) qui est configurée pour supporter le premier ensemble d'éclairage

rage moulé, dans lequel l'unité de logement comprend un polymère renforcé par des fibres et dans lequel le vitrage en plastique est fixé à l'unité de logement.

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15. Véhicule comprenant un hayon de véhicule selon la revendication 13 ou 14.

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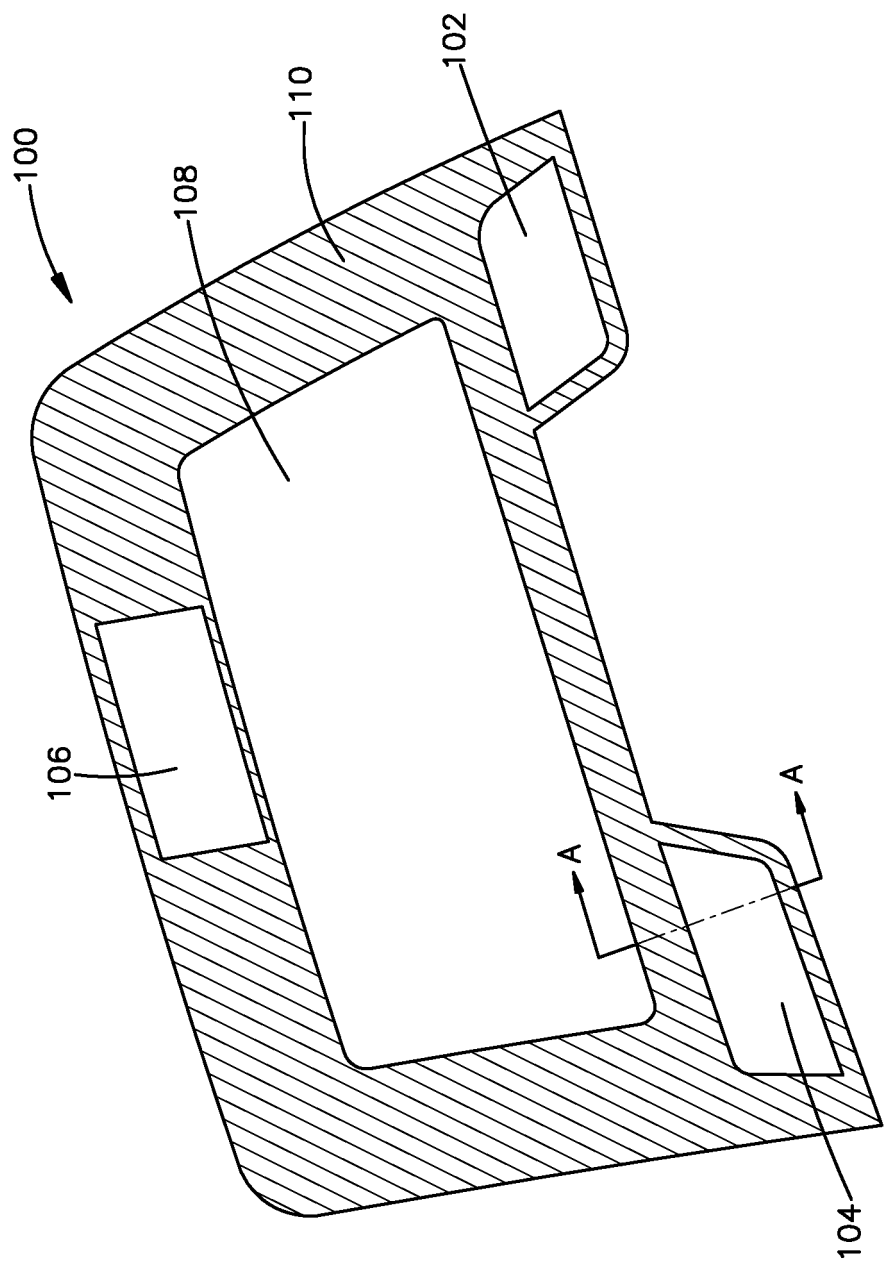
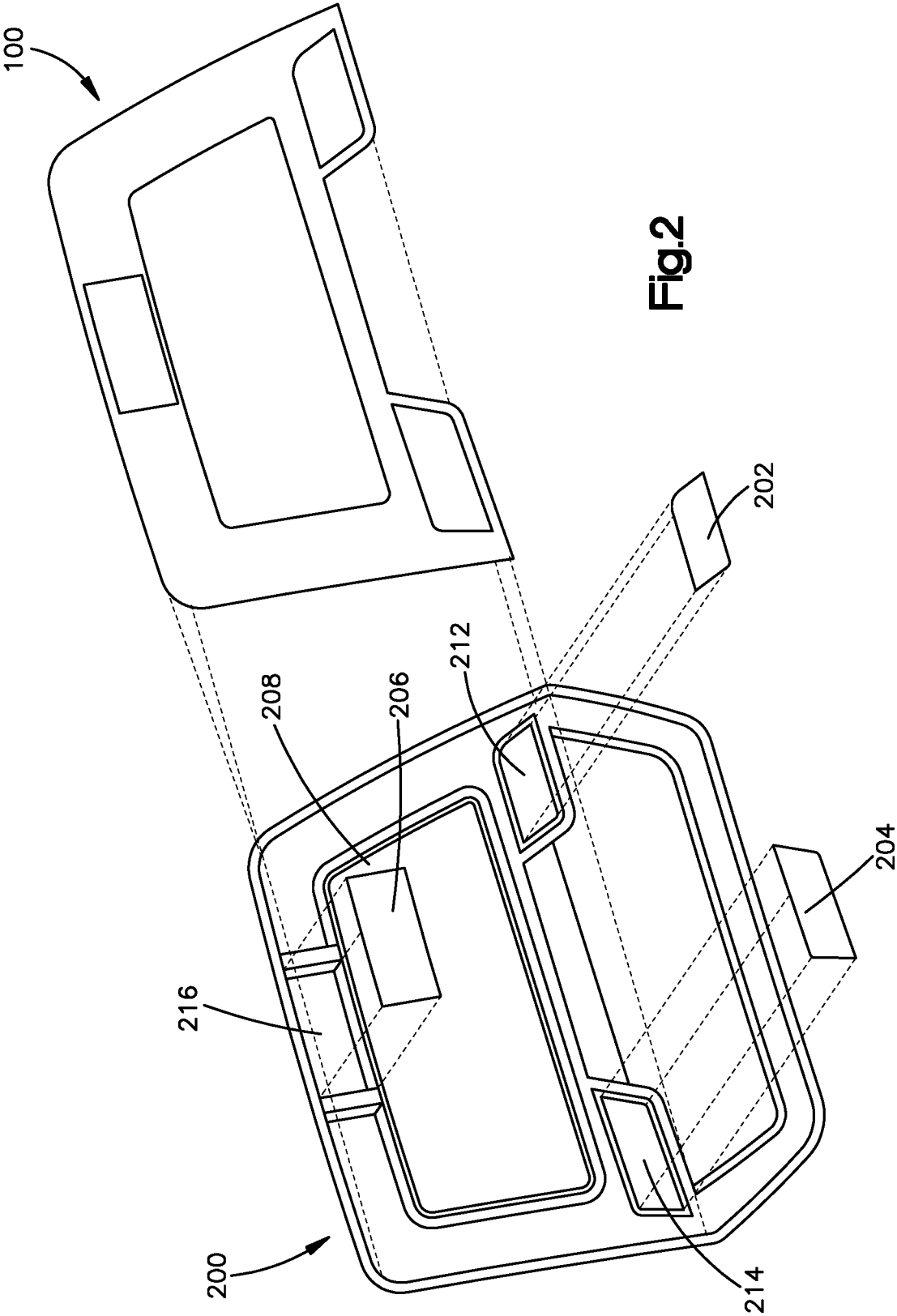


Fig.1



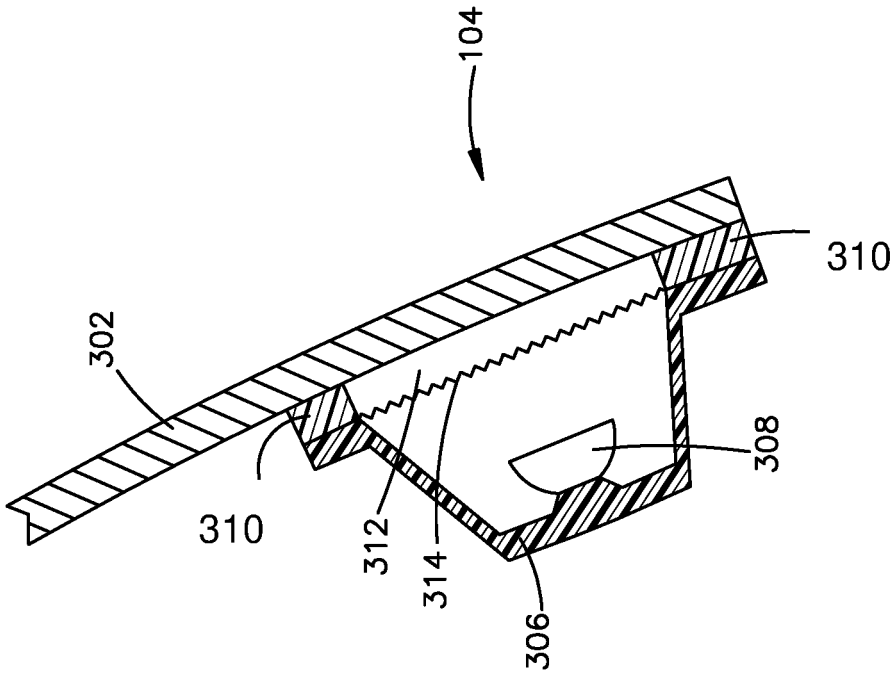


Fig. 4

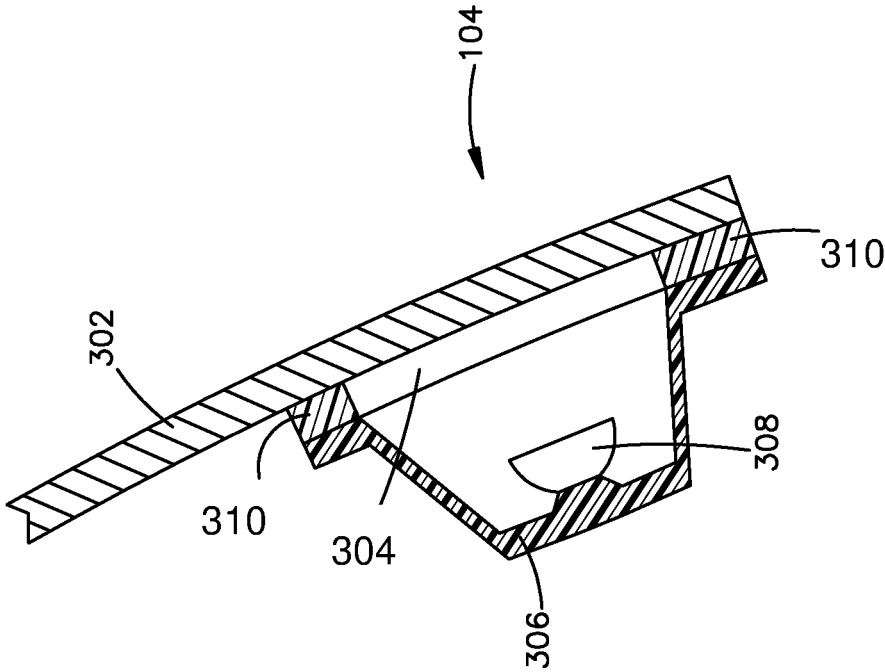
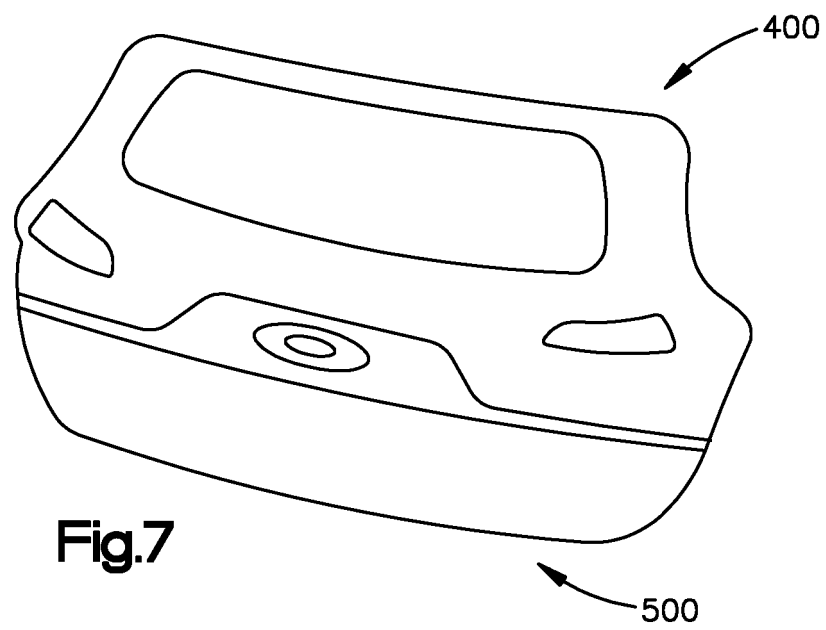
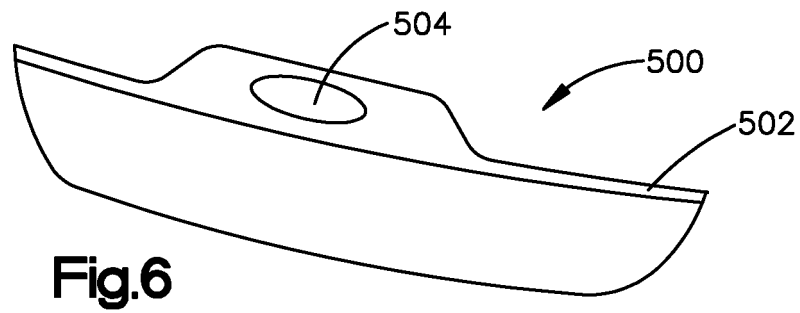
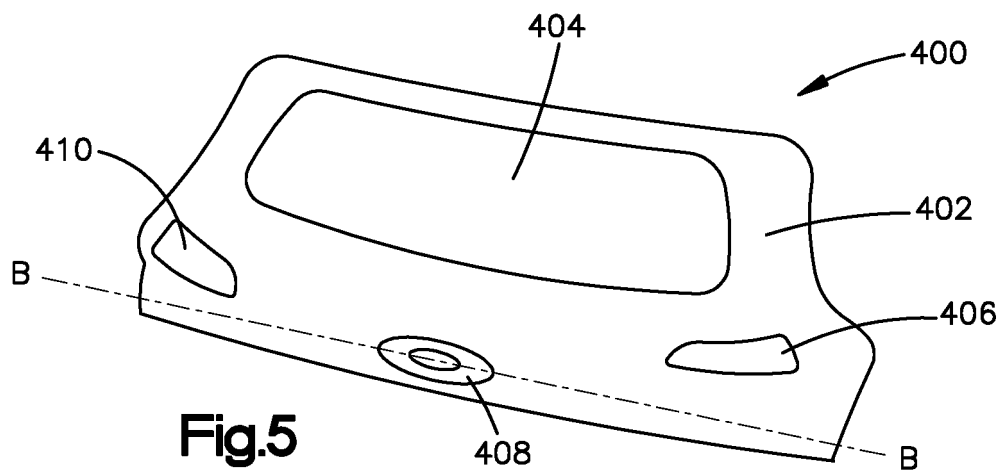


Fig. 3



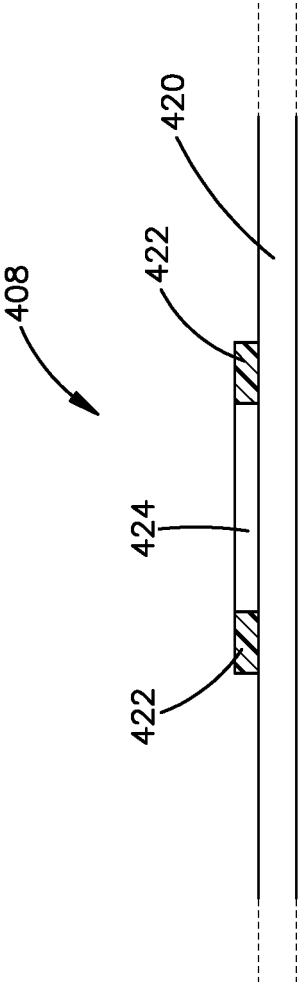


Fig.8

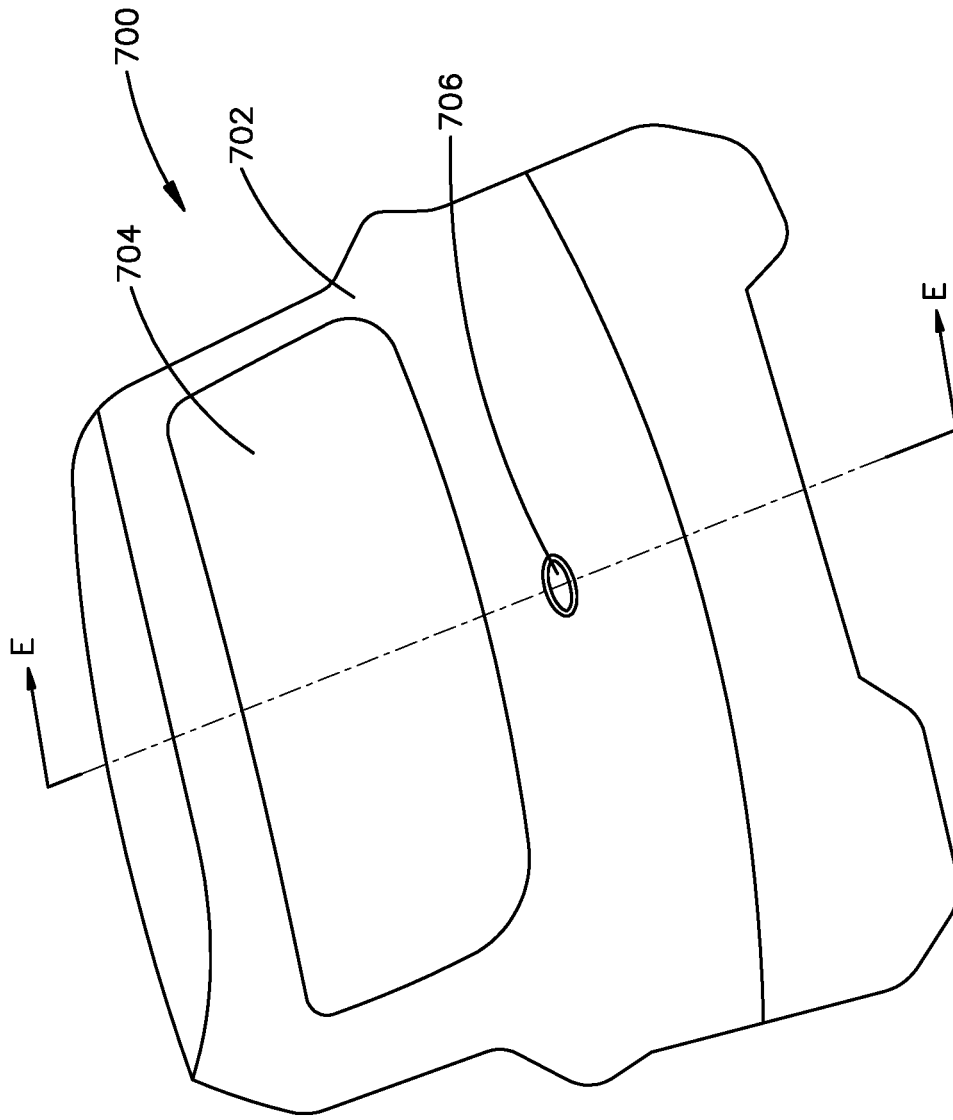


Fig.9

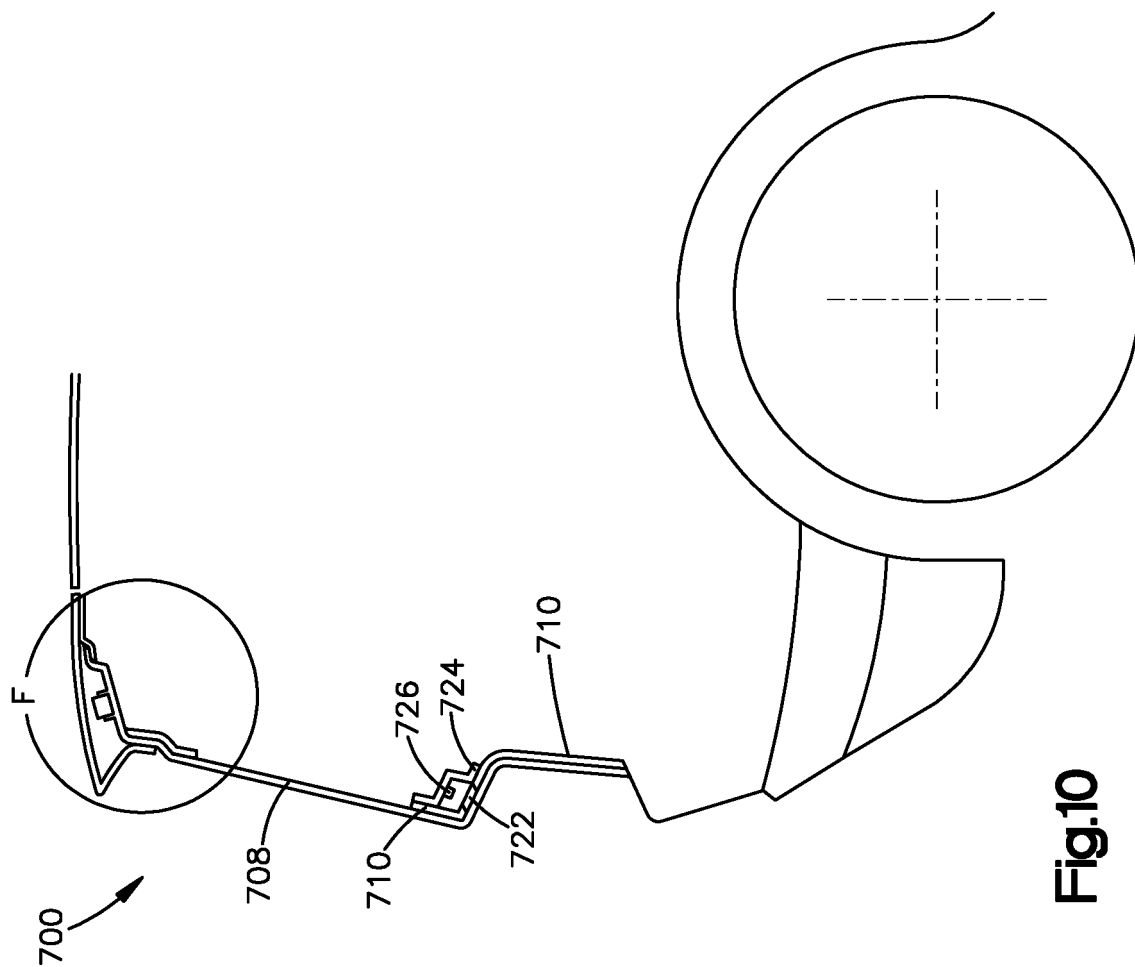


Fig.10

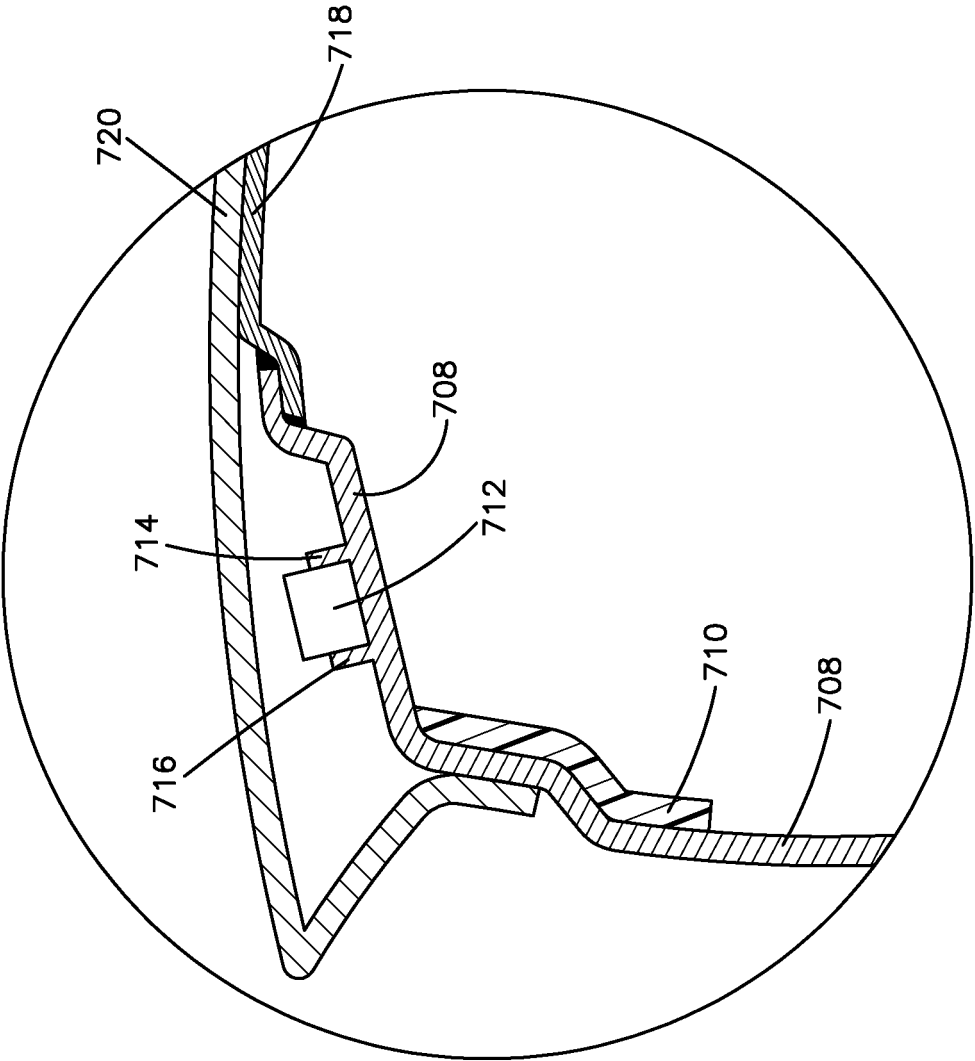


Fig.11

REFERENCES CITED IN THE DESCRIPTION

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